

Appl. No. 10/618,258
Amdt. Dated March 16, 2005
Reply to Office Action of November 23, 2004

Attorney Docket No. 81788.0252
Customer No.: 26021

Amendments to the Drawings:

The attached sheets of drawings include changes to FIGS. 12 and 13A-13E. These sheets, which include FIGS. 12 and 13A-13E replace the original sheets including FIGS. 12 and 13A-13E. The figures have been designated as Prior Art as requested by the Examiner.

Attachment: Replacement Sheet
 Annotated Sheet Showing Changes

REMARKS

This is in response to the Office Action mailed November 23, 2004. The time period for responding to the Office Action is extended to March 23, 2005 by the accompanying petition for extension of time. Claims 1-34 are pending. Claims 5-8 and 11-31 are withdrawn from consideration. Reexamination and reconsideration are respectfully requested.

The Office Action requires that FIGS. 12 and 13A-13E be designated with a legend such as prior art. Applicant submits proposed drawing changes as indicated on the attached sheets and replacement drawing sheets according to the Office Action.

The Office Action rejects claims 1, 2, 9 and 32-34 over the art discussed in the background of the application taken in view of U.S. Patent No. 5,734,703 to Hiyoshi (the Hiyoshi Patent) further taken in view of U.S. Patent No. 4,614,873 to Umeji (the Umeji patent). Applicants submit that this combination of references does not produce the present invention.

The present application describes a micro-electro mechanical system (MEMS) having a movable MEMS assembly where that MEMS assembly moves in response to a voltage generated at least in part by a circuit that is part of the MEMS apparatus. Some MEMS apply high voltages to move parts of the MEMS. The need to provide high voltages can in some cases be inconvenient in that many systems do not normally provide a high voltage power supply. The present application describes MEMS that incorporate a circuit that converts light to generate a voltage that is used to move a portion of the MEMS (such as a mirror, switch or latch). For example, a number of photo diodes connected in series can be used to generate a high voltage signal to drive a MEMS assembly, for example moving the assembly between positions. Each of the diodes in the series individually generates a voltage across it so that a sufficiently high voltage is generated by the circuit. In this way, effective and reliable MEMS are provided that do not require a separate high voltage power supply.

This aspect of the application's MEMS is reflected in exemplary claim 1, which recites in part:

“a light-receiving circuit having a series circuit of series-connected light-receiving devices that receive the emitted light to generate a voltage; and
a MEMS assembly driven by the generated voltage.”

The prior art of record neither teaches nor suggests providing as part of a MEMS a light-receiving circuit that generates a voltage that drives a MEMS assembly. More specifically, the secondary references identified in the Office Action are not capable of generating a voltage or driving a MEMS assembly.

The Office Action identifies the Hiyoshi patent as teaching a circuit that receives light and generates a voltage. What the Hiyoshi patent describes is an optical isolation device for use in an analog modem. An example of the optical device 12 is shown in FIG. 1 and described in column 10 as including a photo-transistor 12b. AC power supply Z applies alternating voltages to bridge circuit 11. The photo-transistor 12b acts as a switch. In response to light from photodiode 12a, the photo-transistor 12b becomes conducting to connect points A and C in the bridge circuit 11.

Rather than generating a voltage, the photo-transistor 12b receives light and becomes more conductive, reducing the voltage. Thus, if the circuit of the Hiyoshi patent were inserted into the device described in the background of the application, the resulting device would not operate in the manner recited by claim 1. Specifically the resulting combination would not receive light to generate a voltage. Even if the Hiyoshi patent's circuit were connected in series, no voltage would be generated.

The Umeji patent does not cure the deficiencies of the Hiyoshi patent. The Umeji patent describes photothyristors 21-1 to 21-N that act as switches in response to light. Thus, the photothyristors can become conducting in response to light, but they cannot generate a voltage.

Applicant consequently submits that the combination of the background art, the Hiyoshi patent and the Umeji patent does not disclose or suggest the invention defined by claim 1.

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Specifically, the combination set forth in the Office Action does not receive light to generate a voltage. Claim 1 and its dependent claims 2-4, 9 and 32-34 consequently distinguish over the cited art and are in condition for allowance.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (213) 337-6700 to discuss the steps necessary for placing the application in condition for allowance.

If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

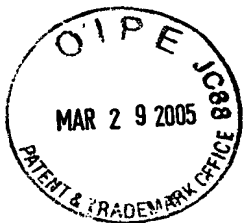
Respectfully submitted,
HOGAN & HARTSON L.L.P.

Date: March 23, 2005

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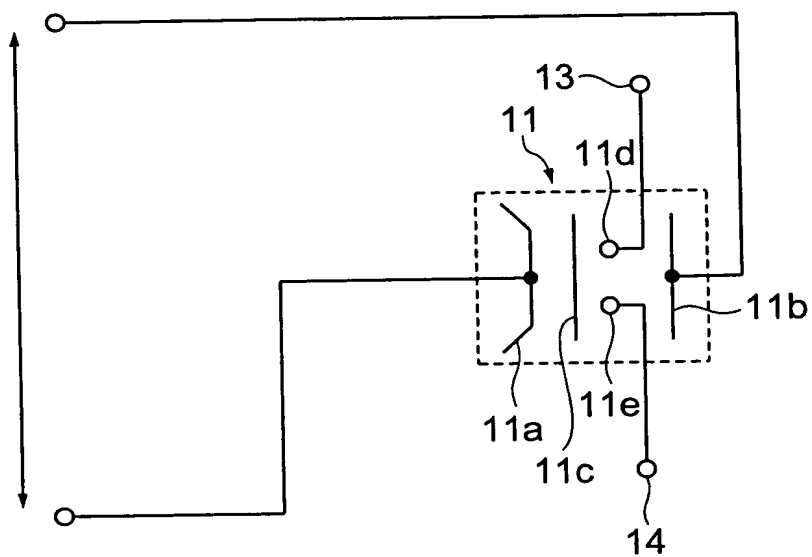


FIG. 12

PRIOR ART

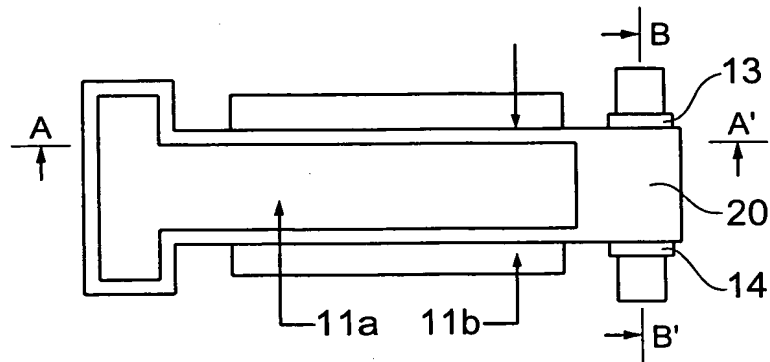


FIG. 13A

PRIOR ART

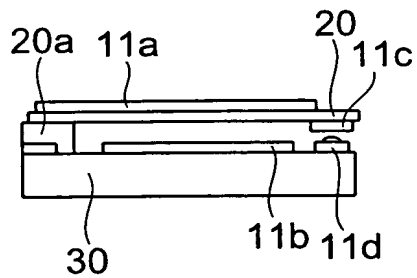


FIG. 13B

PRIOR ART

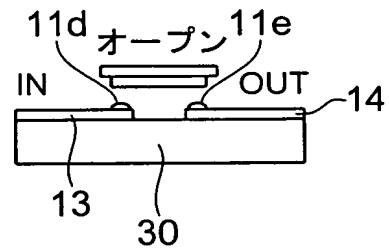


FIG. 13C

PRIOR ART

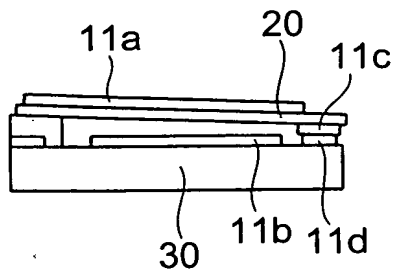


FIG. 13D

PRIOR ART

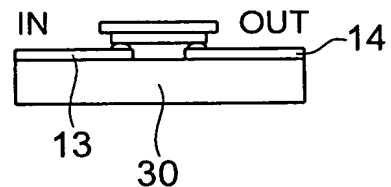


FIG. 13E

PRIOR ART